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## Patent Abstracts of Japan

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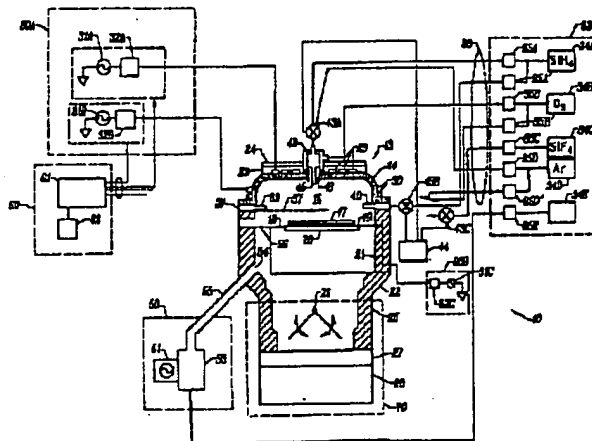
APPLICATION DATE : 03-06-98  
APPLICATION NUMBER : 10154646

APPLICANT : APPLIED MATERIALS INC;

INVENTOR : JANMIN CHAO;

INT.CL. : H01L 21/316 H01L 21/31 // H01L  
21/205

TITLE : HIGH DEPOSITION RATIO RECIPE  
FOR LOW PERMITTIVITY FILM



ABSTRACT : PROBLEM TO BE SOLVED: To make permittivity uniform and reduce free fluorine, by depositing a layer of halogen doped silicon dioxide which has almost uniform permittivity in a trench of a high aspect ratio on a substrate.

SOLUTION: For forming an insulating layer, a substrate 17 is loaded on a substrate retaining member 18 in a process chamber 13 through a vacuum lock door. When the substrate 17 is positioned right, gas flow is established. After a source RF is established, a bias RF is preset before a full bias RF is applied. When the bias RF is established,  $\text{SiF}_4$  gas flows are established. A first part of a layer is deposited on the substrate 17. After the first part of the layer is deposited, the bias RF power is lowered, and wafer heating is reduced. When the other part of the layer is deposited, the respective gas flows of  $\text{SiF}_4$  are increased, and a second part of the layer is deposited. This insulating film is a fluorine doped silicon oxide film which has low permittivity and furnishes a shape following layer.

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